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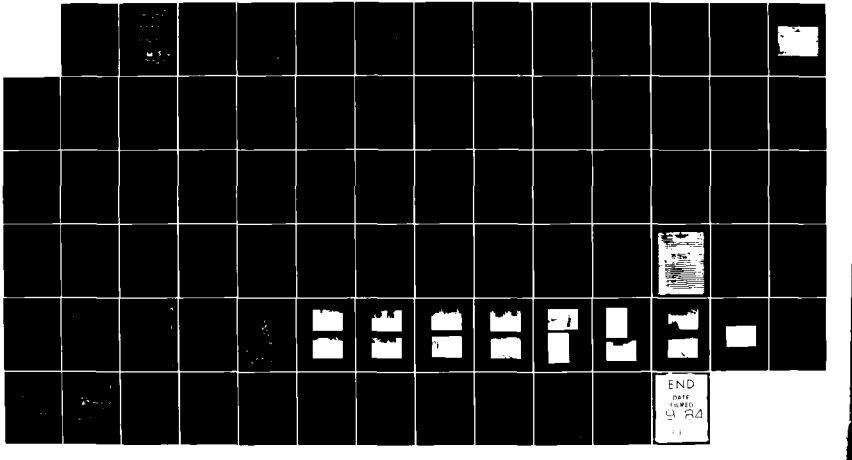

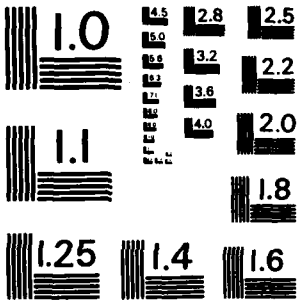

MICROCOPY RESOLUTION TEST CHART
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THAMES RIVER BASIN

GRISWOLD, CONNECTICUT

ASHLAND POND DAM
CT 00437

PHASE 1 INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS.

JUNE 1979

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

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Cover program reads: Phase I Inspection Report, National Dam Inspection Program; however, the official title of the program is: National Program for Inspection of Non-Federal Dams; use cover date for date of report.

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

DAMS, INSPECTION, DAM SAFETY,

Thames River Basin
Griswold, Connecticut

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

Ashland Pond Dam is an earth dam. It has a maximum height of 25 feet and is approximately 450 feet in length. The dam is considered to be in FAIR condition. The dam is classified as INTERMEDATE in size and a HIGH hazard structure in accordance with the recommended guidelines established by the Corps of Engineers. The test flood outflow for this dam is equal to the full PMF and was estimated to be 42,000 CFS (700 CMS).

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THAMES RIVER BASIN
GRISWOLD, CONNECTICUT

ASHLAND POND DAM
CT 00437

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

NATIONAL DAM INSPECTION PROGRAM

PHASE I - INSPECTION REPORT

Identification No.:	CT 00437
Name of Dam:	Ashland Pond Dam
Town:	Griswold
County and State:	New London County, Connecticut
Stream:	Pachaug River
Date of Inspection:	December 7, 8, 1978 and April 10, 1979

BRIEF ASSESSMENT

Ashland Pond Dam is an earth dam reportedly constructed in the late 1700's. The dam has a maximum height of 25 feet and is approximately 450 feet in length. The spillway is located at the left side of the dam embankment. This stone masonry spillway has a crest length of about 110 feet and has no provision for flashboards. An abandoned penstock to the adjacent mill complex and gate structure is located near the right end of the dam. An abandoned headrace and gate structure is located at the left abutment of the dam.

Due to its age, Ashland Pond Dam was neither designed nor constructed by present state-of-the-art procedures. Based upon the visual inspection at the site and the lack of engineering, operational and maintenance data, there are areas of concern which must be corrected to assure the long-term performance of this dam. The dam is considered to be in FAIR condition. Deficiencies include large trees growing on the dam embankment, indication of potential overtopping and limited discharge capacity of the spillway, inoperable outlet structures resulting in no drawdown capability, and the minimal cross section of the right embankment which requires strengthening.

This dam is classified as INTERMEDIATE in size and a HIGH hazzard structure in accordance with the recommended guidelines established by the Corps of Engineers. The test flood outflow for this dam is equal to the full PMF and was estimated to be 42,000 CFS (700 CMS). This flow would overtop the dam by about 9.7 feet, indicating the spillway capacity to be inadequate and needing further hydrologic study. Testing the dam

using one-half the PMF flow also results in overtopping the structure by 6.3 feet. The maximum spillway discharge of 5,535 CFS represents only 13 percent of the test flood outflow. Overtopping could result in the failure of this earth embankment dam.

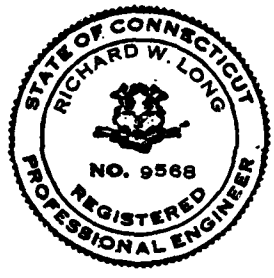
It is recommended that the Owner engage the services of an engineer experienced in the design of dams to accomplish the following: establish a procedure for removal of trees and roots from the dam embankment; evaluate and develop a plan of rehabilitation of the outlet works, conduct further hydrologic studies of spillway adequacy; repair the masonry walls of the spillway and outlet works; evaluate and develop a plan to strengthen the right embankment riprap erosion areas.

Recommendations and remedial measures listed above and detailed in Section 7 should be implemented by the Owner within one year after receipt of this Phase I Inspection Report.

CE MAGUIRE, INC.

BY: Richard W. Long

Richard W. Long, P.E.
Vice President



This Phase I Inspection Report on the Ashland Pond Dam has been reviewed by the undersigned Review Board members. In our opinion, the reported findings, conclusions, and recommendations are consistent with the Recommended Guidelines for Safety Inspection of Dams, and with good engineering judgment and practice, and is hereby submitted for approval.

CHARLES G. TIERSCH, Chairman
Chief, Foundation and Materials Branch
Engineering Division

FRED J. RAVENS, Jr., Member
Chief, Design Branch
Engineering Division

SAUL C. COOPER, Member
Chief, Water Control Branch
Engineering Division

APPROVAL RECOMMENDED:

JOE B. FRYAR Chief, Engineering Division

PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, DC 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or to property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reserve was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through continued care and inspection can there be any opportunity to detect unsafe conditions.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test Flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonable possible storm runoff), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as necessarily posing a highly inadequate condition. The test flood provides a measure of relative spillway capacity and serves as an aide in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

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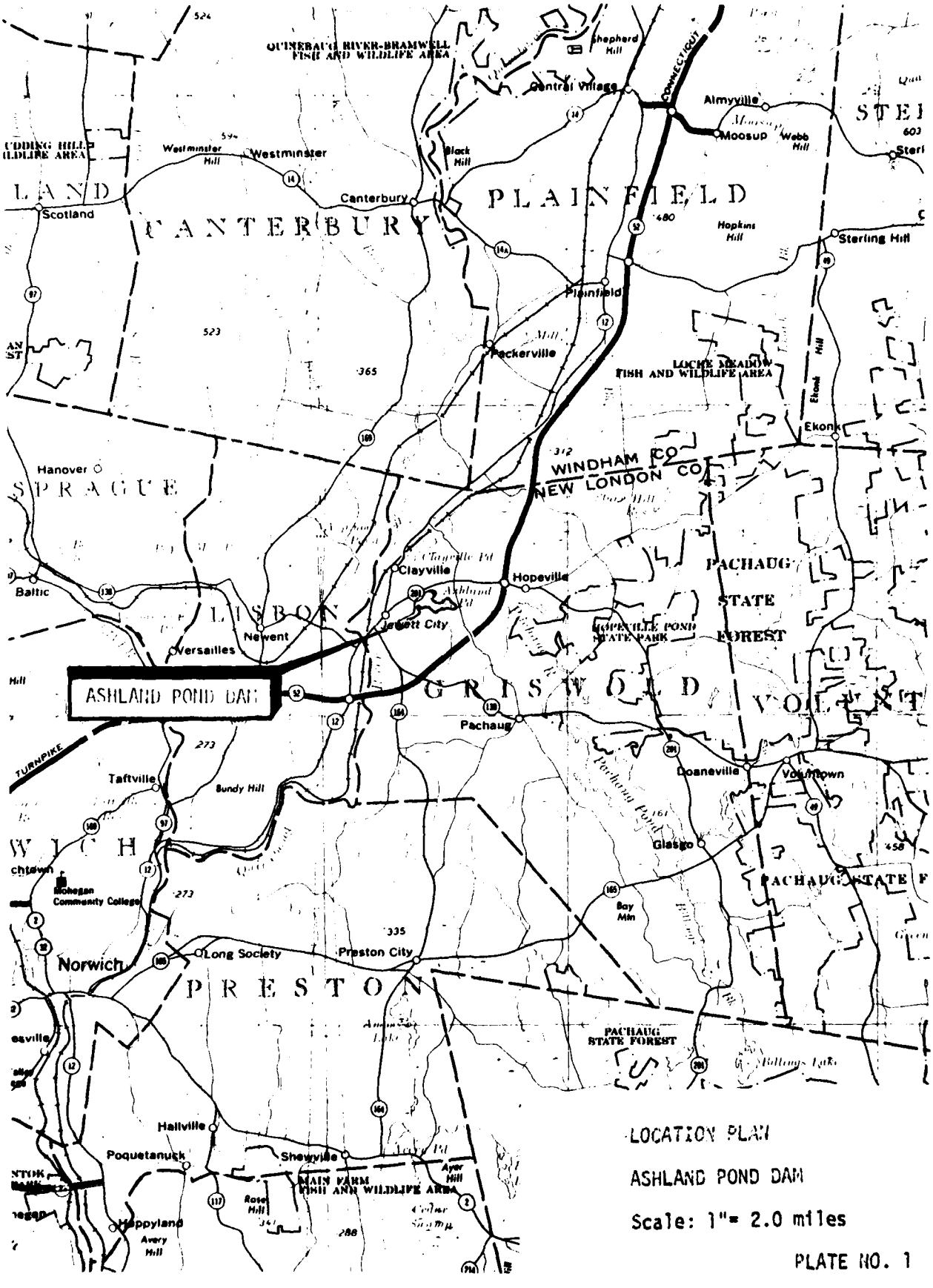
APPENDICES

Ashland Pond Dam - Overview Photo



LOCATION PLAN

ASHLAND POND DAM

Scale: 1"= 2.0 miles

PLATE NO. 1

NATIONAL DAM INSPECTION PROGRAM

PHASE I - INSPECTION REPORT

NAME OF DAM: ASHLAND POND DAM

SECTION 1

PROJECT INFORMATION

1.1 General

a. Authority. Public Law 92-367, August 8, 1972, authorized the Secretary of the Army through the Corps of Engineers to initiate a national program of dam inspection throughout the United States. The New England Division of the Corps of Engineers has been assigned the responsibility of supervising the inspection of dams within the New England Region. C E Maguire, Inc. has been retained by the New England Division to inspect and report on selected dams in the State of Connecticut. Authorization and notice to proceed was issued to C E Maguire, Inc., under a letter from Ralph T. Garver, Colonel, Corps of Engineers. Contract No. DACW33-79-C-0015 has been assigned by the Corps of Engineers for this work.

b. Purpose of Inspection

1. Perform technical inspection and evaluation of non-Federal dams to identify conditions which threaten the public safety and thus permit correction in a timely manner by non-Federal interests.

2. Encourage and assist the States to initiate quickly effective dam safety programs for non-Federal dams.

3. To update, verify and complete the National Inventory of Dams.

1.2 Description of the Project

a. Location. Ashland Pond Dam is located in the Town of Griswold, New London County, Connecticut. Coordinates of the dam are about 41° 36.3'N Latitude and 71° 58.6'W Longitude. The dam is in the Village of Jewett City, which is part of Griswold, Connecticut. (See Plate 1). The dam impounds water from the Pachaug River which drains a 61.82 square mile water-shed of rolling terrain.

The reservoir has a total surface area of 83 acres. The impoundment is aligned in a northeast-southwest axis, with the dam located at the southwest extremity.

b. Description of Dam and Appurtenances. The Ashland Pond Dam is an earth embankment approximately 450 feet in length, 25 feet high, with a crest width of about 11 feet. The main portion of the dam embankment is to the right side of the structure and has a typical slope upstream of 2H to 1V and downstream of 1.5H to 1V. A stone masonry spillway and an abandoned outlet control structure are located at the left abutment of the dam. This abandoned outlet control structure is located to the left of the spillway and consists of a rack and pinion vertical lift gate. The gate is now inoperable but was used to control flow to a headrace for a mill complex located immediately downstream and to the left of the dam. The abandoned headrace is filled with debris and small trees and effectively blocked at its downstream end. (See Photos C-7 through C-11 and plan on Appendix B-3).

A second abandoned control structure and penstock are also located near the right abutment of the dam. The gates of this control structure are also inoperable. The penstock supplied water for hydroelectric power generation now retired for the mill complex immediately downstream from the dam. (See Photos C-6; C-13; C-14 and plan on Appendix B-3).

An intake structure for the fire protection system of the mill is located at the right abutment of the dam. An eight-inch pipeline carries water from the intake structure to a pumping station located within the mill that provides water for the fire protection system. (See Photos C-5 and C-6).

c. Size Classification. Ashland Pond Dam has an impoundment capacity at the top of the dam (Elev. 133.0, National Geodetic Vertical Datum, NGVD) of 1000 Ac-Ft. and a height of 25.0 feet, which classifies this dam as INTERMEDIATE in size.

d. Hazard Classification. The dam is classified as a HIGH hazard structure because it is located where its failure discharge can cause damage due to high velocity, impact from debris and flooding to homes (10), commercial properties (5), Ashland Street, Routes 138 and 12 and utilities adjacent to those roadways. The estimated water depth due to the possible dam failure discharge of 23,100 CFS may range from 17 feet at the dam to 15 feet at a

distance of 4,000 feet from the dam. See Appendix D for calculations.

e. Ownership. The Ashland Pond Dam is owned by the United Merchants and Manufacturing Company.

f. Operator. Operating personnel are under the direction of:

Mr. Brian Trudell
Director of Maintenance
United Merchants & Manufacturing Company
16 Ashland Street
Jewett City, Connecticut 06351

g. Purpose of Dam. The Ashland Pond Dam impounds water from the Pachaug River for recreational and fire protection use. United Merchants and Mfg. Company and Plastic Wire and Cable company both use the reservoir as a source of water for their fire protection systems.

h. Design and Construction History. The dam was reportedly constructed in the late 1700's; however, its present configuration resulted from additional construction about 1864. No construction records are available regarding the history of construction, repair work or maintenance.

The mill complex immediately downstream of the dam was constructed in 1864 and hydroelectric generating equipment was installed at some later date.

i. Normal Operating Procedures

The gates of the outlet works are inoperable and the spillway is uncontrolled. There is no regulation of the water surface levels nor is there any release of water to augment low flows below the dam.

1.3 Pertinent Data

a. Drainage Area. Ashland Pond is located in New London County in eastern Connecticut. The basin is generally rectangular in shape with a length of approximately 10 miles, a width of 8 miles, and a total drainage area of 61.82 square miles (See Drainage Basin Map in Appendix D). The topography is generally flat to rolling with elevations ranging from a high of 500 feet to 127 feet at the spillway crest. Basin slopes are flat to moderate having slopes of 0.015 feet/foot to 0.045 feet/foot. The average time of concentration for the entire drainage basin is estimated to be six to ten hours.

Due to the relatively large size of the watershed and the concentration time, it is improbable that all surface runoff will peak at the reservoir simultaneously during a high intensity rainfall event. In addition, the large upstream storage areas in the watershed tend to moderately dampen and delay the peak of the surface runoff.

b. Discharge at Dam Site. There are no discharge records available for this dam. Listed below are calculated discharge data for the spillway and outlet works assuming the outlet works to be operable:

1. Outlet Works:
   To Pachaug River - Two 4-ft. wide by 6-ft. high rectangular gates.

2. Maximum Known Flood at Dam Site - Unknown.

3. Overflow spillway capacity @ Top of Dam - 5335 CFS at Elevation 133.0.

4. Overflow spillway capacity at "Test Flood Level" - 42,000 CFS at Elevation 142.7 with overtopping of dam.

5. Gated outlet capacity at normal pool level - 852 CFS at Elevation 127.0. (spillway crest).

6. Gated outlet capacity at maximum pool level - 1,044 CFS at Elevation 133.0.

7. Total project capacity at "Top of Dam" - 6,579 CFS @ Elevation 133.0.

8. Gated outlet capacity at Test Flood Level - 1,295 CFS at Elevation 142.7.

9. Total project discharge at "Test Flood Level" - 43,295 CFS @ Elevation 142.7.

c. Elevations (Feet above National Geodetic Vertical Datum, NGVD)

1.	Streambed at centerline of dam -	Upstream - not observable; Downstream - 108.0
2.	Maximum Tailwater	Unknown

3.	Upstream Inlet Invert	---
4.	Recreation Pool	N/A
5.	Full Flood Control Pool	N/A
6.	Spillway Crest	127.0
7.	Top of Dam	133.0
8.	Test Flood	142.7

d. Reservoir Length (in Feet)

1.	Maximum Pool	15,000
2.	Recreation Pool	N/A
3.	Flood Control Pool	N/A

e. Storage (Ac-Ft)

1.	Recreation Pool	N/A
2.	Flood Control Pool	N/A
3.	Test Flood Pool	1,805
4.	Spillway Crest Pool	502
5.	Top of Dam (El. 158.0)	1,000

6. Net storage between top of dam (El. 133.0) and spillway crest is 498 Ac-Ft. and represents 0.15 inches of runoff from the drainage area of 61.82 square miles.

7. Each foot of surcharge storage above spillway crest to top of dam equals 0.025 inches of runoff from the drainage area of 61.82 square miles.

f. Reservoir Surface (Acres)

1.	Top of Dam	83
2.	Test Flood Pool	83
3.	Flood Control Pool	N/A

	4.	Recreation Pool	N/A
	5.	Spillway Crest	83
g.	Dam		
	1.	Type	Earth Embankment
	2.	Length	450 feet
	3.	Height (main embankment)	25 feet maximum
	4.	Top Width (main embankment)	11 feet
	5.	Side Slopes	Upstream 2H:1V Downstream 1.5H:1V
	6.	Zoning	Unknown
	7.	Impervious Core	Unknown
	8.	Cutoff	Unknown
	9.	Grout Curtain	Unknown
	10.	Other	--
h.	Diversion and Regulating Tunnel		N/A
i.	Spillway		
	1.	Type	Overflow, sharp crest, vertical fall.
	2.	Length of Weir	110 feet
	3.	Crest Elevation	127.0 (from USGS Topographic sheet)
	4.	Gates	None
	5.	U/S Channel	Natural bed
	6.	D/S Channel	Natural bed with rock and stone masonry apron
	7.	Design Surcharge	Unknown

8.	General	------
j.	Regulating Outlet	
	Refer to paragraph 1.2b, "Description of Dam and Appurtenances" for description of outlet works.	
1.	Downstream invert	112.0±
2.	Size	Two-4 ft. wide by 6 ft. high rectangular stone masonry openings.
3.	Control mechanism	Manually operated vertical lift gear mechanism, uncovered, on stone masonry platform.

SECTION 2

ENGINEERING DATA

2.1 Design

No design data is available for this dam. An inspection report has been included in Appendix B.

2.2 Construction Data

No record of construction is available for this dam.

2.3 Operation Data

No operation records of this facility are maintained.

2.4 Evaluation of Data

a. Availability. There are no plans, specifications or computations available from the Owner, County, State, or Federal Offices regarding the design, construction or subsequent repairs and modifications to this dam.

b. Adequacy. The lack of in-depth engineering data did not allow for a definitive review. Therefore, the adequacy of this dam could not be assessed from the standpoint of reviewing design and construction data, but is based primarily on visual inspections, past performance and sound engineering judgment.

c. Validity. The validity of the limited data must be verified.

SECTION 3

VISUAL INSPECTION

3.1 Findings

a. General. Based on visual inspection, history and general appearance, the Ashland Pond Dam and its appurtenances are judged to be in fair condition. The dam embankment is overgrown with many large trees, unchecked erosion areas exist; the crest is not level, and the cross section of the right embankment is narrow and requires strengthening. The gate mechanism on the outlet structure is inoperable resulting in no drawdown capability at the dam.

b. Dam. The dam is an earth embankment. No construction drawings are available, nor are the details of design and subsequent repair known.

1. Crest. From Sta 0+50 to 3+00, the crest of the dam is generally grass-covered with numerous erosion paths and depressions which give the surface of the crest an irregular appearance. Average top of dam elevation 133.0 varies 1.0'± at some locations. For station locations, see sketch Appendix B-3. There are trees growing on the crest in several locations, as indicated in Photos C-1, 3, and 4. The erosion on the upstream slope at Sta 1+50 has cut into the upstream edge of the crest, as shown in Photo C-15. The crest along the approximately 20-ft. section between the wing walls for the inlet gate structure (Sta 1+90) is about 18 inches lower than the crest of the adjacent embankment sections, as shown in Photo C-4.

To the left of the spillway section the crest is generally covered with grass, brush and trees, as shown in Photos C-7 and 8. A sluiceway bordered by stone masonry walls cuts through the dam at about Sta 4+35 and joins the downstream spillway channel further downstream. Some water was observed flowing through the sluiceway and apparently seeping under the left masonry wall of the sluiceway, as indicated in Photos C-10 and 11. Adjacent to the right wall of the sluiceway, there is a 3 to 4-feet deep erosion gully. An erosion hole about 6 feet long and 4 feet wide was also observed in this area.

2. Upstream Slope. From Sta 0+50 to 1+80, the upstream slope of the dam consists of a relatively steep earth slope covered with grass, tall weeds, and some trees, as shown in Photos C-13 and 15. There is no riprap cover on the visible portion of the upstream slope. At Sta 1+10, there is an intake system for the fire prevention system in the factory (Photo C-6). Extensive erosion has occurred on the upstream slope in a 30-foot section located at about Sta 1+50. A clump of trees up to 6 inches in diameter is growing on the slope in this area as indicated in the photos.

   From Sta 1+80 to about Sta 3+00, a vertical stone masonry wall forms the upstream face, as shown in Photo C-13. The gate structure for the intake to plant turbines is located in this section at about Sta 1+90 (Photos C-13 and 14). At Sta 3+00, the masonry wall makes a right angle bend downstream and forms the right training wall for the spillway and downstream channel, as shown in Photos C-7 and 8.

   The upstream slope to the left of the spillway between Sta 4+12 and Sta 4+77 is also formed by a vertical stone masonry wall which bends to form the left training wall for the spillway and downstream channel, as shown in Photo C-8. At about Sta 4+40, there is a gate structure, shown in Photo C-9, for a sluiceway that runs through the dam to the downstream channel. (Photo C-10).

3. Downstream Slope. As shown in Photos C-1, 3 and 4, the downstream slope of the dam from Sta 0+50 to 3+00 is relatively steep and partially covered with grass. Soil is exposed and erosion has occurred in several areas. There are trees up to 8 inches in diameter and large stumps on the slope at several locations. As shown in Photo C-3, at approximately Sta 2+10, there is a vehicle ramp cut in the downstream slope. Some erosion has occurred on this ramp.

c. Appurtenant Structures. The appurtenant structures for this dam are the overflow spillway, the abandoned outlet works structure, and the abandoned gates and penstock formerly used to supply water to generate hydroelectric power for the mill complex.

   1. Spillway and Training Walls. The spillway weir is constructed of cut stone blocks which form a

sharp crest as shown in Photos C-6 and 7. A small depression approximately three feet in diameter and 8 to 12 inches deep was observed upstream of the spillway apron approximately ten feet left of the right training wall. The condition of the spillway crest and downstream face of the dam was not observable because of the depth of water overflow. The training walls consist of cut stone masonry with mortared joints. Much of the mortar has been dislodged and repointing of the joints of the training walls is necessary.

2. Outlet Works. The abandoned outlet works located at the left abutment of the dam is in POOR condition. The hand-operated vertical lift gate mechanism is inoperable and there is considerable leakage around the gate as is shown on Photos C-5 and 13. The headrace from this outlet works is divided into two channels. The first channel joins the Pachaug River approximately 20 feet downstream of the dam as shown in Photo C-7 and is the outlet for the outlet works; and the second channel has been plugged at its lower end and was the headrace leading to an abandoned mill downstream. Both channels are filled with debris as is shown on Photo C-11, 14.

3. Abandoned Penstock and Intake Works. An abandoned penstock and intake works located at approximately Sta 1+90 is shown in Photo C-12. The gate mechanisms have been dismantled and closed permanently as shown in Photo C-11 and water no longer flows through the penstock to the turbines of the United Merchants mill complex. Some leakage around the gates of the intake structure was observed but it is not considered serious at this time.

4. Fire Protection System Intake Structure. The intake structure for the mill's fire protection system located at Sta 1+20 is shown in Photo C-8. The fire protection system is supplied with water by an 8-inch line from this structure. The intake structure was in the process of being renovated during the dam inspection. This structure provides no drawdown capability for the dam.

d. Reservoir Area. No specific detrimental features in the reservoir area were observed during the visual inspection. The slopes of the watershed are well-covered with growth to preclude sloughing of shoreline material.

e. Downstream Channel. The channel downstream of the spillway is approximately 100 feet wide and is bordered by stone masonry walls, as shown in Photo C-12. There are two small drops about 1.5 and 2 feet high located approximately 30 feet and 150 feet downstream from the spillway, respectively. As noted in Photo C-12, there are a few trees growing in the downstream channel.

3.2 Evaluation

Based on the visual inspection, the overall dam appears to be in FAIR condition. The inspection disclosed the following items which could affect the future performance of the dam:

a. There is no riprap protection on the earth slope portion of the upstream face of the dam and extensive erosion has occurred on the slope.

b. There are trees and brush on the crest, upstream slope, and downstream slopes. The root systems associated with this vegetation can create paths for seepage if allowed to grow without limit.

c. Soil is exposed and erosion has occurred in several areas of the downstream slope, including the vehicle ramp that is cut into the downstream slope.

d. Seepage apparently is occurring under the left training wall of the sluiceway of the outlet works.

e. There are trees growing in the downstream spillway channel and in the sluiceway of the outlet works which could restrict flow in those channels.

f. There is no drawdown capability for the dam because the existing outlet control structure is abandoned and inoperable.

g. Electric power service is carried overhead to the mill complex by a utility pole at the toe of the right embankment of the dam. The electric power service to the mill could be lost in the event the dam was overtopped.

h. The cross section of the right embankment is small and should be strengthened to provide greater stability of the embankment.

i. There is leakage around the gate of the abandoned outlet structure and the intake structure for the abandoned penstock. The outlet channels from the abandoned outlet structure is filled with debris and should be cleaned.

SECTION 4

OPERATIONAL PROCEDURES

4.1 Procedures

Since the outlet structure for the dam is not operable, the water level for Ashland Pond is not controlled and no formal operational procedures are followed.

4.2 Maintenance of Dam.

Maintenance of the dam consists of the occasional cutting of brush and grass mowing along the crest of the earth embankment.

4.3 Maintenance of Operating Facilities. There are no formal maintenance procedures followed for the operating facilities.

4.4 Description of Any Warning System in Effect.

Emergency action and/or warning would be coordinated through the maintenance director of United Merchants and Manufacturing Company, Mr. Brian Trudell (203/376-4780). There are no formal emergency operation plans in effect for lowering the pond level in anticipation of severe storms. Monitoring of the approach of intense storm activity is normally through the U.S. Weather Service, or local weather forecasts.

4.5 Evaluation.

Regular operational maintenance procedures for this dam and its appurtenances have not been developed or implemented. In view of the lack of drawdown capability at the dam, it is important that the Owner make arrangements to have the outlet control structure repaired and made operational.

An emergency action plan should be prepared to prevent or minimize the impact of failure. This plan should list the expedient action to be taken and authorities to be contacted.

SECTION 5

HYDRAULIC/HYDROLOGIC

5.1 Evaluation of Features

a. General. The Ashland Pond Dam has a spillway length of 110.0 feet and a surcharge height of 6.0 feet between the top of the dam, at its lowest elevation, and the spillway crest. The total length of the dam is about 450 feet. The reservoir has a total storage capacity of 502 Ac-ft. at spillway crest elevation 127.0 and can accommodate 0.15 inches of runoff from a drainage area of 61.82 square miles. Every foot of depth in the reservoir above spillway crest to top of dam can accommodate 83 Ac-ft. of volume equivalent to 0.025 inches of runoff.

The total available surcharge storage in the impoundment is 498 Ac-Ft. which is equivalent to 0.15 inches of runoff. This dam is basically a low storage-high spillage structure with outflow being 97 percent of test flood inflow. The maximum spillway capacity is 5,535 CFS, which is equivalent to 13.2 percent of the "test flood". Because the dam is an earth embankment, it should be considered unstable against overtopping.

b. Design Data. No specific design data is available for this dam or its appurtenances. In lieu of existing design information, U.S.G.S Topographic Maps (Scale 1" = 2,000') were utilized to develop hydrologic parameters such as drainage area, reservoir surface area, basin slopes, time of concentration and other runoff characteristics. Elevation - storage relationships for the reservoir were approximated. Surcharge storage was computed assuming that the surface area remained constant above the spillway crest. Some of the pertinent hydraulic design data was obtained and/or confirmed by actual field measurements at the time of the field inspection.

The "Test Flood" and floods of lesser magnitude were developed for comparison purposes only based on approved and standard procedures including Corps of Engineers guidelines for Phase-1 studies. The hydrologic characteristics such as upstream storages, basin slopes, shape of watershed, etc., were qualitatively assumed in adopting various inflow discharge values.

Outflow values (routing procedures) and dam failure profiles were computed in accordance with the guidelines

developed by the Corps of Engineers. Final values outlined in this report are approximate and should not be considered a substitute for actual detailed analysis.

c. Experience Data. Certain historical data for recorded discharges and water surface elevations are available at a U.S.G.S. gaging station (01127000) located 1.1 miles downstream on Quinebaug River with drainage area of 715 square miles. These historical data are listed below.

Location	Date	Discharge in C.F.S.	W.S.E. (NG,VD)
i) U.S.G.S. gage (01127000)	Aug, 1955	40700	92.07 with gage height of 29.0 feet
ii) Ashland Pond* Dam Site	Aug, 1955	23100	125.0

*Data prorated for drainage area and slope of Pachang River.

d. Visual Observations.

1. The right embankment has a narrow crest width and small cross section and some erosion has taken place. The right embankment should be strengthened.

2. The freeboard for the dam and length of spillway is limited for such a large drainage area. Provisions should be made to improve the spillway capacity since overtopping can cause extensive damage downstream.

e. Test Flood Analysis. Recommended guidelines for the Safety Inspection of Dams by the Corps of Engineers were used for the selection of the "Test Flood". This dam is classified as a HIGH hazard structure and INTERMEDIATE in size. Guidelines indicate that a full P.M.F. should be used as the test flood for this classification. The Ashland Pond Dam watershed has a total drainage area of 61.82 square miles, of which 6.2 square miles, or 10 percent, is swampy or covered by storage ponds. The average basin slope is moderate and equal to 0.03 feet/feet, and for this analysis the watershed was considered to be flat to rolling. A "test flood" equal to the full P.M.F. was estimated to be 700 CSM, or 43,274 CFS. The outflow discharge developed using the Corps of Engineers

criteria and approximate routing techniques was 42,000 CFS. Additional data developed for this investigation is included in the table at the end of this section.

The spillway capacity is hydraulically limited to pass the "test flood" (PMF) and overtopping of the dam would occur (approximately 9.71 feet). The inflow and outflow discharge values for this "test flood" are 43,274 CFS and 42,000 CFS, respectively. The maximum outflow capacity of the spillway in a stillwater condition without overtopping of the dam is 5,535 CFS which represents 13.2 percent of the test flood overflow discharge. The overtopping potential for discharges of lesser magnitude and frequency (approximate only) are listed in the table at the end of this section. The spillway and outlet rating curves are illustrated in Appendix D.

At the spillway crest elevation of 127.0, the capacity of the outlet structure is 852 CFS, (assuming the gate could be opened or removed). It will require 1.2 hours to lower the reservoir level the first foot assuming a constant pond surface area of 83 acres.

Each foot of depth in the reservoir above spillway crest to top of dam can approximately accommodate 0.025 inches of effective rainfall from the watershed. Consequently, it is estimated that overtopping of the dam cannot be prevented by lowering the pool level in the reservoir for the test flood inflow.

f. Dam Failure Analysis. Assuming the reservoir is full to the top of the dam, the calculated dam failure discharge of 23,100 CFS will produce an approximate water surface elevation of 125.0 downstream from the dam. This flow will raise the water surface 7.4 feet over the estimated depth just prior to failure of the dam when the discharge is 5,535 CFS. Normal uniform flow, based on Manning's formula, will occur approximately 4,000 feet downstream from the dam with a depth of flow equal to 15.0 feet. For this distance of 4,000 feet, the depth of flow will decrease from 17.0 feet to 15.0 feet. This failure discharge will damage approximately ten homes, five industrial and commercial properties, three roads, (Ashland Street, and State Routes 12 and 138), utilities (those adjacent to the roadways) and considerable downstream flooding. Water surface elevations due to failure of the dam are computed and are listed in Appendix D.

ASHLAND POND DAM
Inflow, Outflow and Surcharge Data

FREQUENCY IN YEARS	24-HOUR TOTAL RAINFALL IN INCHES	24-HOUR* EFFECTIVE RAINFALL IN INCHES	MAXIMUM INFLOW IN C.F.S.	MAXIMUM** OUTFLOW IN C.F.S.	SURCHARGE HEIGHT IN FEET	SURCHARGE STORAGE ELEVATION
10	5.0	2.6	4487	4260	5.16	132.16
50	6.5	4.1	7076	7040	7.16	134.16
100	7.0	4.6	7940	7800	7.53	134.53
1/2 PMF	11.9	9.5	21637	20000	11.25	138.25
TEST FLOOD = PMF	21.4	19.0	43274	42000	15.71	142.71

*Infiltration assumed as 0.1"/hour

**Lake assumed initially full at spillway crest elevation 127.0.
(top of dam = 133.0)

NOTES:

1. Q_{10}; Q_{50}; Q_{100}; inflow discharges were computed by the approximate methodology of the Soil Conservation Service.
2. The "test flood" computation is based on COE instructions and guidelines.
3. The maximum capacity of the spillway without overtopping the dam (elevation 133.0) is equal to 5,535 CFS.
4. All discharges indicated are dependent upon the continued integrity of upstream storage reservoirs.
5. Surcharge storage is allowed to overtop the dam when exceeding the spillway capacity.
6. Test flood = one PMF = 700 CSM = 43,274 CFS

SECTION 6

STRUCTURAL STABILITY

6.1 Evaluation of Structural Stability

a. Visual Observations. The visual inspection did not disclose any immediate stability problems. The locations where erosion is currently occurring and where it has occurred in the past should be restored to avoid potential future difficulties. Locations where the embankment cross-section has been reduced by erosion or by grading for vehicular access should be restored to grade to assure the stability of the embankment.

b. Design and Construction Data. There is insufficient design and construction data to permit a formal evaluation of stability. There is, for example, inadequate information concerning zoning in the earth dam.

c. Operating Records. There is no recorded information indicating past stability problems.

d. Post-Construction Changes. Erosion has occurred on the upstream and downstream slopes. Continued erosion will decrease the stability of the dam.

e. Seismic Stability. Ashland Pond Dam is located in Seismic Zone 1 and in accordance with the recommended guidelines of the Corps of Engineers does not warrant seismic analysis.

SECTION 7

ASSESSMENT, RECOMMENDATIONS, AND REMEDIAL MEASURES

7.1 Dam Assessment

a. Condition. Based on the visual inspection, the dam appears to be in FAIR condition. There are some features which could affect the long-term performance of the dam in the future if they are not corrected as recommended in Sections 7.2 and 7.3.

b. Adequacy of Information. The information available and a visual inspection are not sufficient to analyze the safety of the dam. At this time, an assessment of safety is based solely on a visual inspection which cannot disclose all potential problems that the dam could develop in the future. Downstream face and crest of spillway could not be inspected due to overflow of water.

c. Urgency. The recommendations and remedial measures presented below should be implemented by the Owner within 1 year after receipt of this Phase I inspection report.

d. Need for Additional Investigation. No information or observation indicates that the Ashland Pond Dam requires a comprehensive investigation at this time. However, the recommendations and remedial measures outlined in Sections 7.2 and 7.3 will require some additional engineering input, analysis and design.

7.2 Recommendations

The Owner should engage the services of an engineer experienced in the design of dams to accomplish the following:

1. The spillway discharge capacity is considered limited, therefore, further hydrologic studies are required to determine what alternative measures are necessary to significantly improve the discharge capabilities of the dam and reduce the overtopping potential.

   Investigate, inspect and evaluate further the condition of the spillway crest, slopes and training walls to develop a program for their rehabilitation if needed. This inspection to be carried out when there is no flow over the spillway.

2. Trees and brush on the upstream and downstream slopes of the embankment should be trimmed. The trees should be removed only after a procedure has been developed by a competent engineer using proper backfill and compaction.

3. The upstream slope should be repaired where it has been eroded and suitable riprap protection should be installed in all unprotected areas.

4. Consideration should be given to strengthening the cross section of the right embankment to provide greater stability of the dam embankment, particularly in those areas reduced in cross section.

5. The abandoned outlet structure and discharge channel should be repaired to provide a means for lowering the reservoir level for emergency drawdown or to perform maintenance or repair of the dam.

6. The intake structure for the abandoned penstock should be permanently sealed to prevent any leakage.

7. A topographic survey of the dam and its appurtenances should be made that will result in accurate drawings of the existing conditions to be used in a program of rehabilitation of the dam.

8. Perform more detailed hydrological studies of spillway adequacy.

7.3 Remedial Measures

a. Operating and Maintenance Procedure.

1. Develop a system for the recording of data with regard to items such as water levels, discharges, to assist those responsible for the monitoring and operation of the dam.

2. Existing erosion gullies should be filled and grass planted where unprotected soil is exposed.

3. Trees, brush and debris should be removed from the downstream spillway and sluiceway channels on a regular basis.

4. The seepage exiting under the training wall of the sluiceway should be monitored on a regular basis.

5. Steps should be taken to prevent trespassing on the downstream slope and crest of the dam to reduce or eliminate further erosion.

6. Continue the technical inspections of this facility on an annual basis.

7. Develop and post an emergency action plan including a warning system in order to prevent or minimize the impact of dam failure. It should include the expedient action to be taken, authorities to be contacted, and locations of emergency equipment and materials.

7.4 Alternatives.

None

APPENDIX A

INSPECTION CHECK LIST

VISUAL INSPECTION CHECK LIST
PARTY ORGANIZATION

PROJECT Ashland Pond Dam

DATE Dec. 7 and 8, 1978

TIME PM (both days)

WEATHER 50° Cloudy

W.S.ELEV. _____ U.S. _____ D.S.

PARTY :

1. A. Reed - CEM
2. S. Khanna - CEM
3. R. Brown - CEM
4. D. Sluter - CEM
5. R. Murdock -G.E.I.
6. S. Whiteside - GEI
7. B. Trudell - United Merchants
8. Manufacturing Co.
9. _____
10. _____

	PROJECT FEATURE	INSPECTED BY	REMARKS
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

PERIODIC INSPECTION CHECK LIST

PROJECT Asnland Pond Dam DATE December 7, 1978

INSPECTOR _____ DISCIPLINE _____

INSPECTOR _____ DISCIPLINE _____

AREA EVALUATED	CONDITION
DAM EMBANKMENT	
Crest Elevation	El. 127.0
Current Pool Elevation	
Maximum Impoundment to Date	Unknown
Surface Cracks	None observed
Pavement Condition	All sections of dam unpaved
Movement or Settlement of Crest	Erosion at Sta. 1+50
Lateral Movement	None observed
Vertical Alignment	Undulating in some areas, crest eroded at Sta. 1+50.
Horizontal Alignment	Good
Condition at Abutment and at Concrete Structures	Erosion at junction of dam and stone masonry wall at Sta 1+80 & 4+39.
Indications of Movement of Structural Items on Slopes	None observed.
Trespassing on Slopes	Roadway cut at angle in D/S slope to crest of dam at Sta 1+90, cars trespass on slope and crest.
Sloughing or Erosion of Slopes or Abutments	Erosion evident in zones on U/S & D/S slopes and on crest.
Rock Slope Protection - Riprap Failures	No riprap on section of dam not bordered w/masonry wall(from Sta 0+00 to 1+80)
Unusual Movement or Cracking at or Near Toe	None observed.
Unusual Embankment or Downstream Seepage	None observed.
Piping or Boils	None observed.
Foundation Drainage Features	None observed.

PERIODIC INSPECTION CHECK LIST

PROJECT Ashland Pond Dam DATE December 7, 1978

INSPECTOR _____ DISCIPLINE _____

INSPECTOR _____ DISCIPLINE _____

AREA EVALUATED	CONDITION
Toe Drains	None observed
Instrumentation System	None observed.
Vegetation	Trees & grass on U/S slope up to Sta. 1+80. Grass & trees up to 12" on D/S slope. Trees, grass & stumps on crest.

PERIODIC INSPECTION CHECK LIST

PROJECT Ashland Pond Dam DATE _____

INSPECTOR _____ DISCIPLINE _____

INSPECTOR _____ DISCIPLINE _____

AREA EVALUATED	CONDITION
OUTLET WORKS - INTAKE CHANNEL AND INTAKE STRUCTURE	(INTAKE TO MILL)
A. Approach Channel	Underwater not observable
Slope Conditions	Underwater not observable
Bottom Conditions	Underwater not observable
Rock Slides or Falls	Underwater not observable
Log Boom	None
Debris	Underwater not observable
Condition of Concrete Lining	Underwater not observable
Drains or Weep Holes	Underwater not observable
b. Intake Structure	Stone masonry, vertical lift gates Not used (3 gates)
General Condition	Poor to fair condition. Rt. side appears to have collapsed and been repaired.
Stop Logs and Slots	None.
OUTLET WORKS - INTAKE CHANNEL AND INTAKE STRUCTURE (AT SPILLWAY)	
a. Approach Channel	Underwater not observable. No log boom.
b. Intake Structure	
General Condition	Good
Stop Logs and Slots	None

PERIODIC INSPECTION CHECK LIST

PROJECT Ashland Pond Dam DATE _____

INSPECTOR _____ DISCIPLINE _____

INSPECTOR _____ DISCIPLINE _____

AREA EVALUATED	CONDITION
OUTLET WORKS - CONTROL TOWER	(SPILLWAY GATE)
a. Concrete and Structural	
General Condition	Good
Condition of Joints	None - Mondithic
Spalling	None observed.
Visible Reinforcing	None observed.
Rusting or Staining of Concrete	Slight.
Any Seepage or Efflorescence	None observed.
Joint Alignment	None
Unsual Seepage or Leaks in Gate Chamber	Yes, leakage observed through gates.
Cracks	None observed.
Rusting or Corrosion of Steel	Yes
b. Mechanical and Electric	Vertical lift gate mechanism - rack and pinion. Inoperable due to missing teeth on rack. Gate in closed position.

PERIODIC INSPECTION CHECK LIST

PROJECT Ashland Pond Dam DATE _____

INSPECTOR _____ DISCIPLINE _____

INSPECTOR _____ DISCIPLINE _____

AREA EVALUATED	CONDITION
OUTLET WORKS - CONTROL TOWER	INTAKE TO MILL
a. Concrete and Structural	Cut stone masonry
General Condition	Poor to fair; see intake structure for mill intake.
Rusting or Corrosion of Steel	Considerable
b. Mechanical and Electrical	3 vertical lift gate mechanisms - rack and pinion - worm drive mechanism disassembled. Appear to be inoperable; lift gate stem is missing.

PERIODIC INSPECTION CHECK LIST

PROJECT Ashland Pond Dam DATE _____

INSPECTOR _____ DISCIPLINE _____

INSPECTOR _____ DISCIPLINE _____

AREA EVALUATED	CONDITION
OUTLET WORKS - TRANSITION AND CONDUIT	(MILL INTAKE)
General Condition of Concrete	Not observable (abandoned inside mill building).
Rust or Staining on Concrete	
Spalling	
Erosion or Cavitation	
Cracking	
Alignment of Monoliths	
Alignment of Joints	
Numbering of Monoliths	

PERIODIC INSPECTION CHECK LIST

PROJECT Ashland Pond Dam DATE _____

INSPECTOR _____ DISCIPLINE _____

INSPECTOR _____ DISCIPLINE _____

AREA EVALUATED	CONDITION
OUTLET WORKS - TRANSITION AND CONDUIT General Condition	(At Spillway) Open channel stone masonry structure filled with debris and trees. Poor condition Extensive leakage (seeps) into channel from beneath lt. wall.

PERIODIC INSPECTION CHECK LIST

PROJECT Ashland Pond Dam DATE _____

INSPECTOR _____ DISCIPLINE _____

INSPECTOR _____ DISCIPLINE _____

AREA EVALUATED	CONDITION
OUTLET WORKS - OUTLET STRUCTURE AND OUTLET CHANNEL	SPILLWAY OUTLET STONE ARCH - MORTARED
General Condition of Stone Masonry	Mortared stone masonry
Rust or Staining	N.A.
Spalling	None observed
Erosion or Cavitation	None observed
Visible Reinforcing	N.A.
Any Seepage or Efflorescence	Considerable seepage observed
Condition at Joints	Many open masonry joints
Drain Holes	None observed
Channel	Discharges to main streambed of Quinebaug River
Loose Rock or Trees Overhanging Channel	Some trees overhang channel
Condition of Discharge Channel	Poor, channel is littered with debris, trees, brush, trash, etc.

PERIODIC INSPECTION CHECK LIST

PROJECT Ashland Pond Dam DATE _____

INSPECTOR _____ DISCIPLINE _____

INSPECTOR _____ DISCIPLINE _____

AREA EVALUATED	CONDITION
OUTLET WORKS - OUTLET STRUCTURE AND OUTLET CHANNEL	MILL OUTLET Not observed. (Abandoned).
Channel	Discharges into main stream of Quinebaug River below spillway
Loose Rock or Trees Overhanging Channel	None observed at discharge.
Condition of Discharge Channel	Natural Riverbed.

PERIODIC INSPECTION CHECK LIST

PROJECT Ashland Pond Dam DATE _____

INSPECTOR _____ DISCIPLINE _____

INSPECTOR _____ DISCIPLINE _____

AREA EVALUATED	CONDITION
OUTLET WORKS - SPILLWAY WEIR, APPROACH AND DISCHARGE CHANNELS	
a. Approach Channel	Natural Riverbed
General Condition	Underwater not observable
Loose Rock Overhanging Channel	" " "
Trees Overhanging Channel	None observed.
Floor of Approach Channel	Underwater not observable
Weir	Weir not observable, due to volume of flow over crest; appears to be stone masonry.
b. Training Walls	
General Condition of Stone Masonry	Mortared stone masonry, good condition.
Rust or Staining	N.A.
Spalling	None observed.
Any Visible Reinforcing	N.A.
Any Seepage or Efflorescence	Slight
Drain Holes	None observed.
c. Discharge Channel	Natural Riverbed
General Condition	Good
Loose Rock Overhanging Channel	None
Trees Overhanging Channel	Some trees growing on channel.
Floor of Channel	2 small drops below dam.
Other Obstructions	Several bridges downstream of spillway.

APPENDIX B

ENGINEERING DATA

APPENDIX B-1

DESIGN, CONSTRUCTION AND MAINTENANCE RECORDS AND LOCATION

Victor J. Galgowski, Dam Safety Engineer
Department of Environmental Protection
State Office Building
165 Capital Avenue
Hartford, Connecticut 06115

Brian Trudell, Director of Maintenance
United Merchants and Manufacturers, Inc.
16 Ashland Street
Jewett City, Connecticut 06351

APPENDIX B-2

COPIES OF PAST INSPECTION REPORTS

STATE OF CONNECTICUT

STATE BOARD OF SUPERVISION OF DAMS

ROOM 317, STATE OFFICE BUILDING, HARTFORD

Created by Chapter 290 of the Public Acts of 1939 to supervise dams, dikes, reservoirs and other similar structures. "All such structures, with their appurtenances, without exception and without further definition or enumeration herein, which, by breaking away or otherwise, might endanger life or property, shall be subject to the jurisdiction conferred by this act."

PLEASE REPLY TO

#114 Thayer Building
Norwich, Connecticut

October 13, 1954

Mr. William S. Wise
Chairman, State Water Commission
State Office Building
Hartford, Connecticut

Dear Sir:-

On October 7, 1952 I reported on several dams along the Pachaug River. This report covers several additional dams not previously covered.

(1) Stone Dam of Fisk Mill Property (United Merchants Foundation)

This dam is located on the Pachaug River a few feet Northeast of Slater Avenue in the Borough of Jewett City, Town of Griswold. This is a stone masonry dam, resting on ledge with stone masonry abutments. Some repairs were made to the dam in 1943 and it is now in good shape. A considerable length of stone wall exists both upstream and downstream from the dam along the pond and river but these are in good shape and will require no work for some time.

I would say that this structure is in good condition and will require no major expenditures for a long time.

(2) Concrete Dam of Fisk Mill Property (United Merchants Foundation)

This is a small concrete dam located a short distance downstream from number (1) described above. There are two sets of wheels in this plant and this diverts the water through the lower set of wheels. This dam has drawoff gates and the dam itself and appurtenances were repaired in 1943. It is in excellent condition and in my opinion will require no work for some time.

(3) Ashland Dam

This dam is located on the Pachaug River a short distance Northeast of Ashland Street in Jewett City, Town of Griswold.

The spillway is a stone masonry section with stone abutments and auxiliary works below it. The dam north of the spillway is

earth embankment for several hundred feet above the mill building. All of these structures are in good condition and should require no repair work for a number of years.

(4) Beachdale Dam

This dam is located at the Northerly end of Beachdale Avenue in Voluntown, Town of Voluntown. It is a short distance West of Route #138.

This is an earth structure several hundred feet long with stone facings near the top. It has two spillways with wood plank foot bridges across and a wooden gate house.

All of the woodwork at these two crossings should be replaced in a short time. This is not too expensive an item but it should be done. Some of the concrete on the North spillway has washed away by scouring and should be patched. The dam itself appears to be in good condition. I think perhaps $3000 should be considered as probable expense in the forseeable future.

(5) Douglas Pond

As you know, this dam washed out several years ago and has not been replaced. I have not made a detailed study of this but I would estimate it would cost at least $50,000 to put this back in shape again.

Very truly yours,

BHP/ew

No. 1

WATER RESOURCES COMMISSION
SUPERVISION OF DAMS
INVENTORY DATA

4

Inventoried By

Date

CT-437

Name of Dam or Pond

Code No. T 14.7 S 3.3 Q 6.6 PG 018

Nearest Street Location

Town

U.S.G.S. Quad

Name of Stream PAUMANOK RIVER

Owner UNITED MERCHANTS & Mfg. Co. 04 1113

Address 1407 BROADWAY,
N.Y., N.Y. 10018

Pond Use 04 Rec. 093 In.

Dimensions of Pond: Width Length Area 101.7A

Total Length of Dam 530 Length of Spillway 130

Location of Spillway

Height of Pond Above Stream Bed 13

Height of Embankment Above Spillway

Type of Spillway Construction

Type of Dike Construction

Downstream Conditions Roads few h.s.

Summary of File Data

Remarks

Class B

INTERDEPARTMENT MESSAGE

STO-201 12-63

SAVE TIME: [illegible]

TO File	AGENCY Water Resources Commission	DATE Jan. 29, 1971
FROM William H. O'Brien, III Civil Engineer	AGENCY Water Resources Commission	TELEPHONE

SUBJECT Ashland Pond Dam, Griswold

In dam folder entitled "Early Dams-Conn-New England" item J, Page 2, there is a paragraph concerning the much greater water usage during low flow months at this dam by the Ashland cotton-mill due to development of reservoirs upstream (around 1865) for control of water.

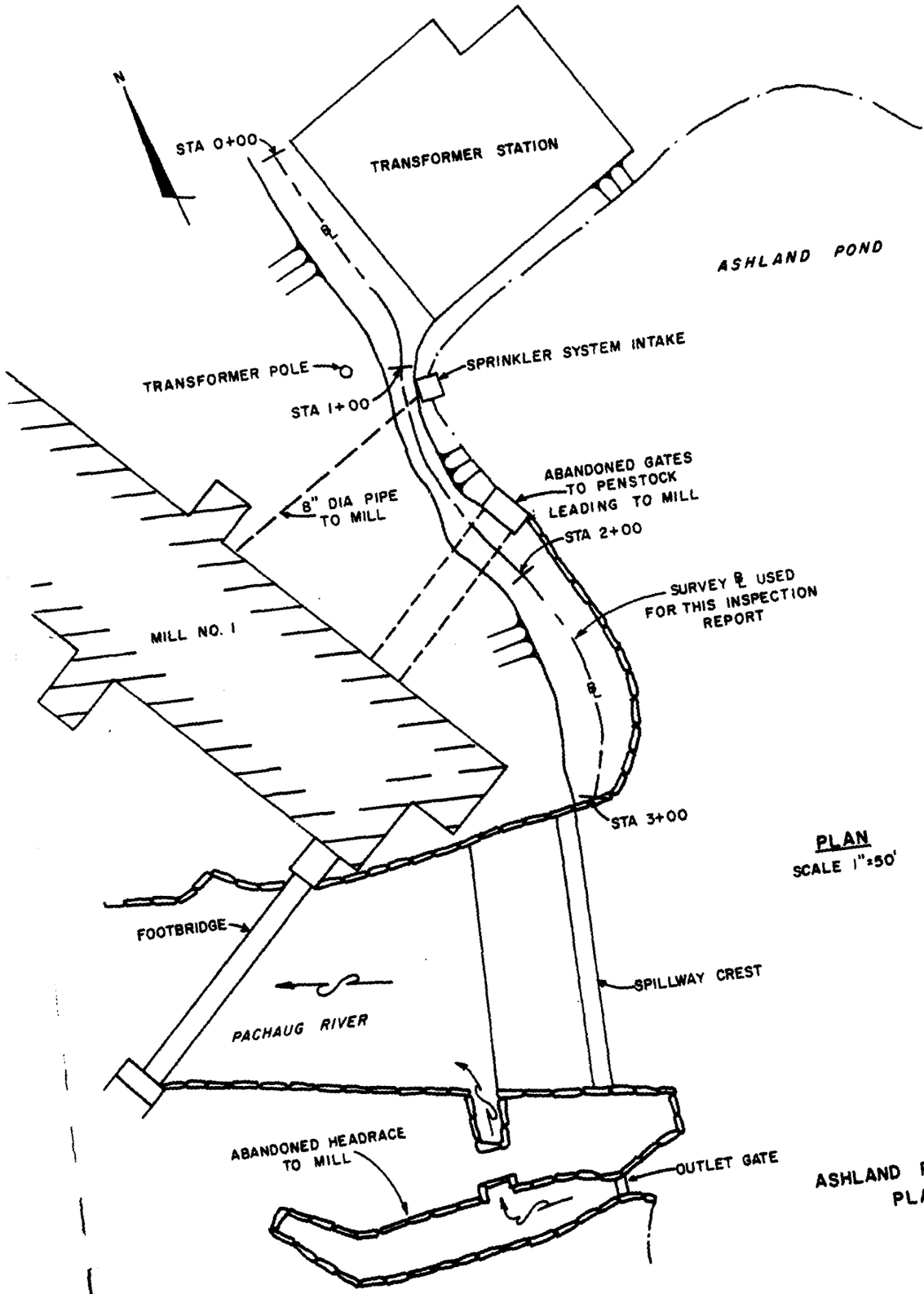
W. H. O'Brien III

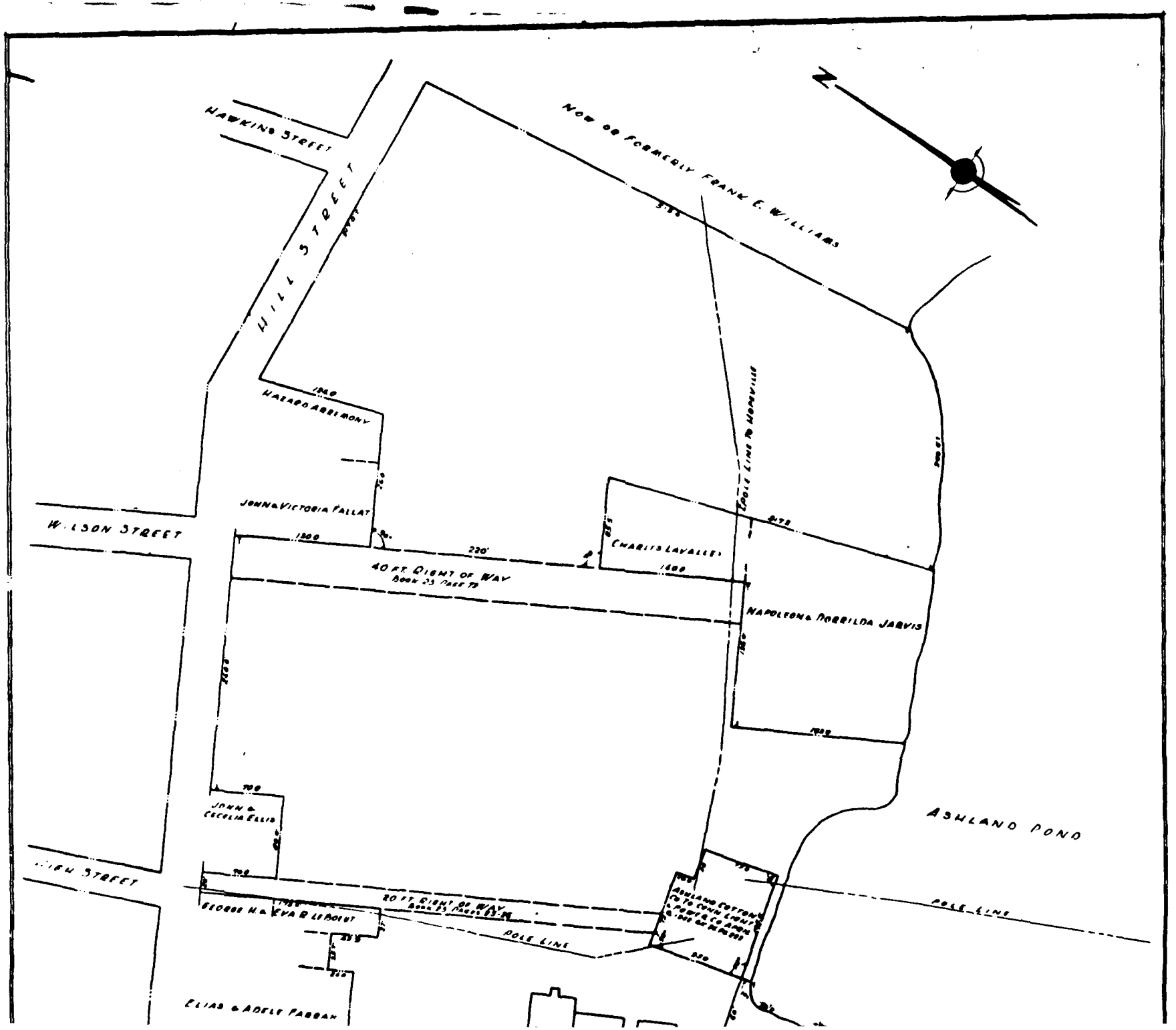
Civil Engineer

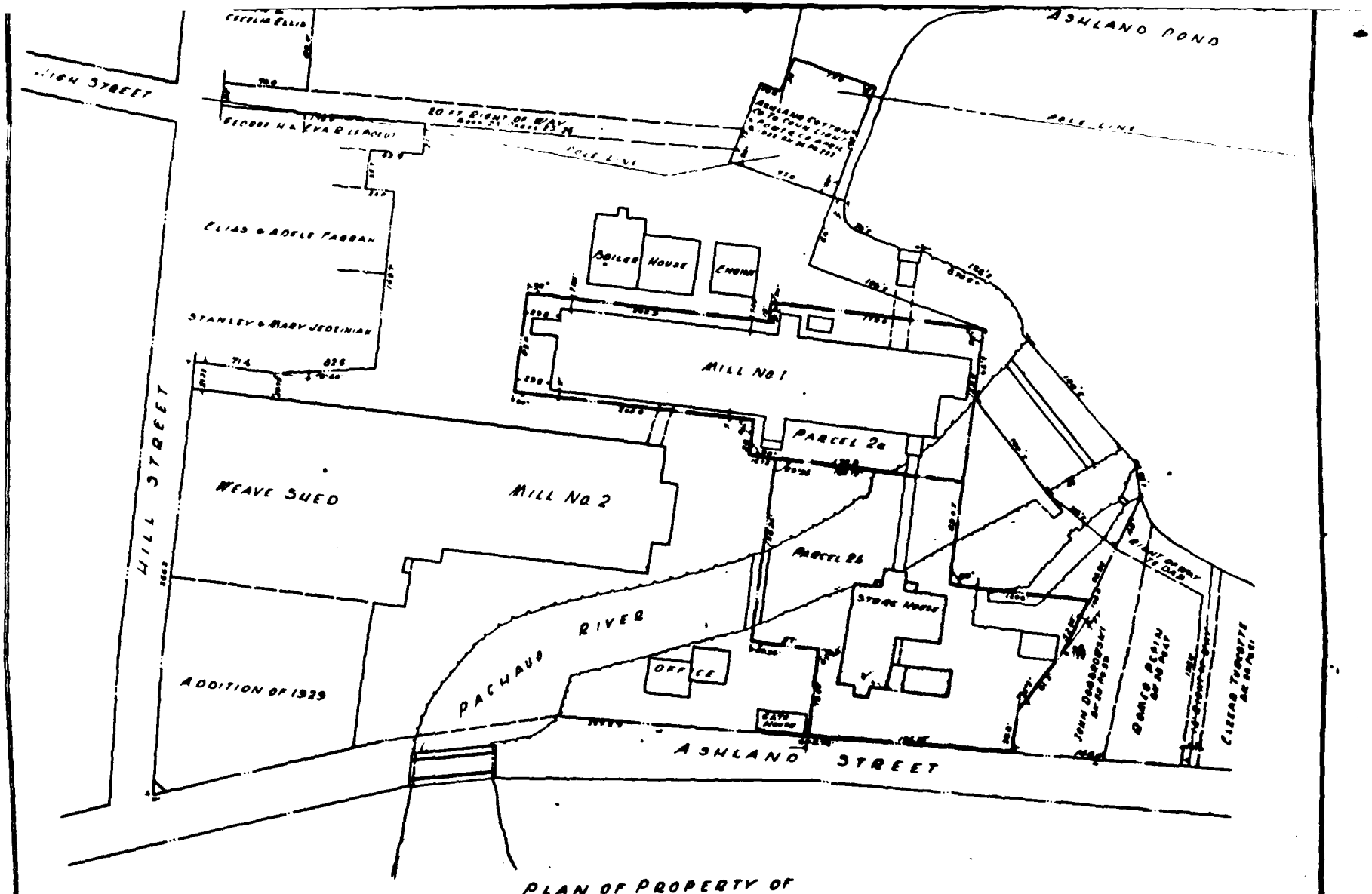
WHO:ljg

APPENDIX B-3

RECORD DRAWINGS AND SKETCHES


N
STA 0+00
TRANSFORMER STATION
℄
ASHLAND POND
TRANSFORMER POLE
SPRINKLER SYSTEM INTAKE
STA 1+00
ABANDONED GATES
TO PENSTOCK
LEADING TO MILL
8" DIA PIPE
TO MILL
STA 2+00
SURVEY ℄ USED
FOR THIS INSPECTION
REPORT
MILL NO. 1
℄
STA 3+00
PLAN
SCALE 1"=50'
FOOTBRIDGE
SPILLWAY CREST
PACHAUG RIVER
ABANDONED HEADRACE
TO MILL
OUTLET GATE
ASHLAND POND DAM
PLAN


HAWKINS STREET
HILL STREET
NOW OR FORMERLY FRANK E. WILLIAMS
POLE LINE TO HORNELL
HAZARD ABELMONT
JOHN & VICTORIA FALLAT
WILSON STREET
CHARLES LAVALLEE
40 FT. RIGHT OF WAY
BOOK 23 PAGE 73
NAPOLEON & MATILDA JARVIS
ASHLAND POND
JOHN & CECELIA ELLIS
HIGH STREET
20 FT. RIGHT OF WAY
BOOK 23 PAGE 53
GEORGE H. & EVA B. LEBOEUF
POLE LINE
ASHLAND COTTONS
ELIAS & ADELE FARRAH



PLAN OF PROPERTY OF

ASHLAND DIVISION, UNITED MERCHANTS & MANUFACTURERS, INC.

SHOWING PARCELS TO BE CONVEYED TO

UNITED MERCHANTS FOUNDATION, INC.

JEWETT CITY ~ TOWN OF GRISWOLD CONN.

CHANDLER & PALMER, ENGRS. NORWICH CONN.

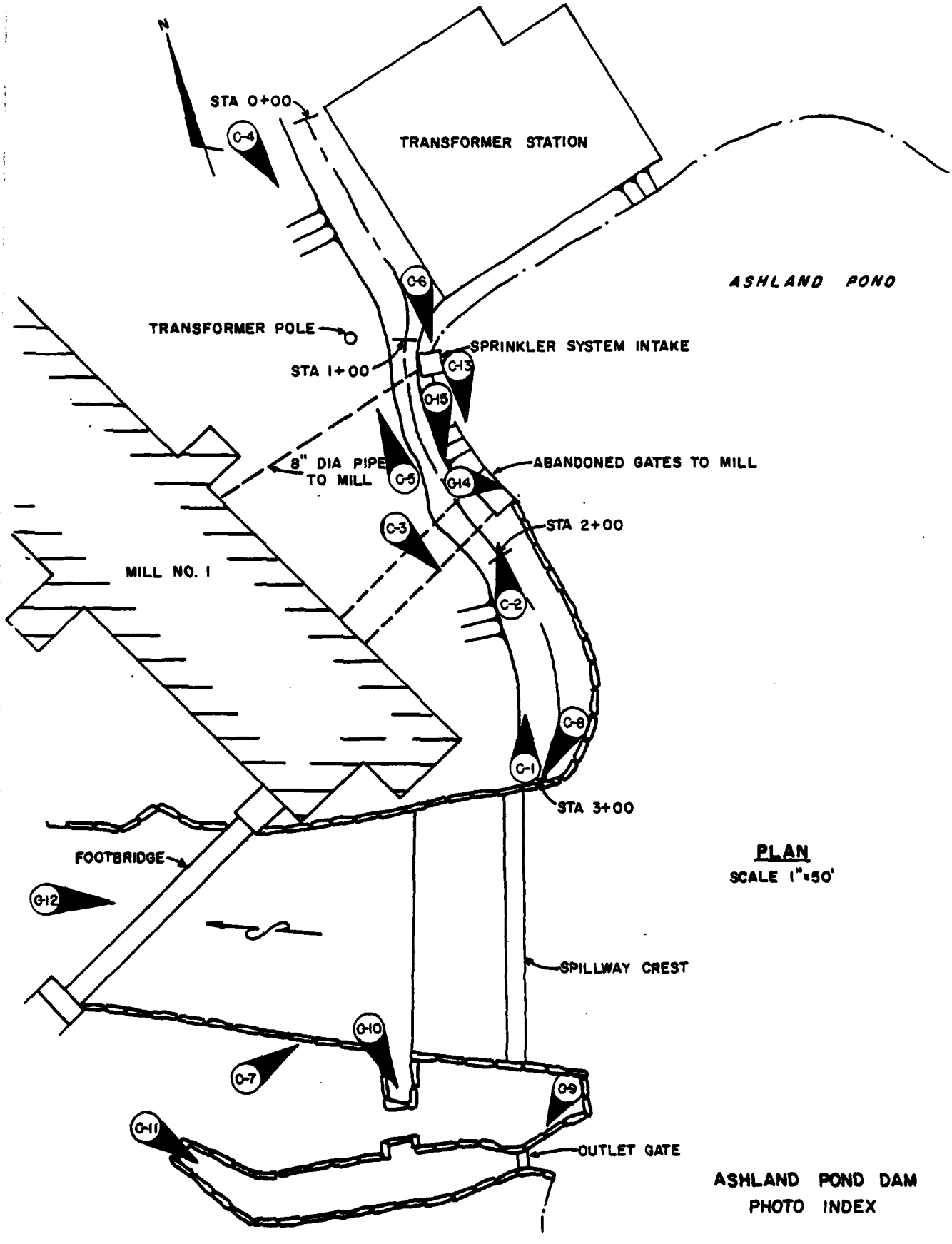
SCALE: 1" = 100'

JUNE, 1963

PHOTO REDUCED
NOT TO SCALE

APPENDIX C

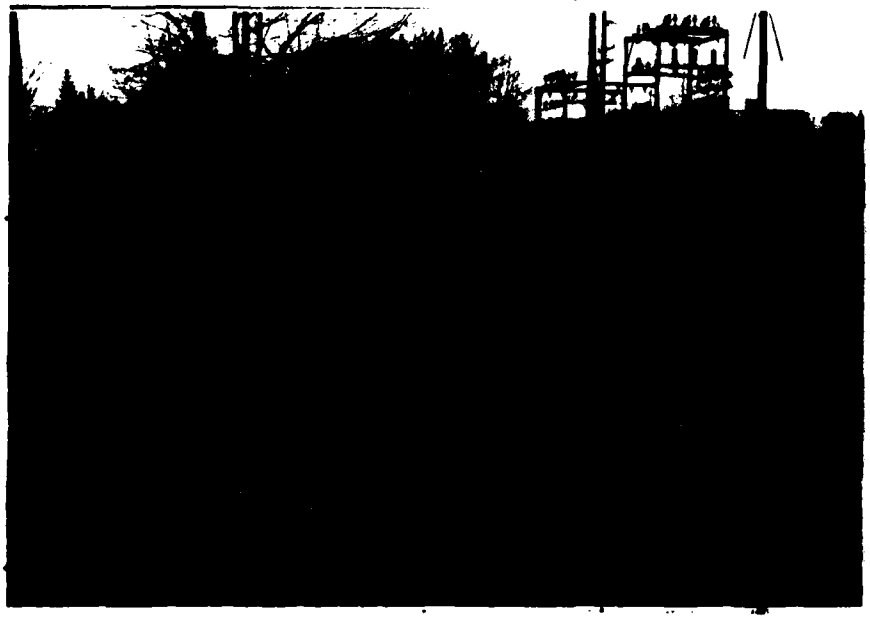
PHOTOGRAPHS



PLAN
SCALE 1"=50'

ASHLAND POND DAM
PHOTO INDEX

C-1 Crest of Dam Embankment.



C-2 Crest of Dam Embankment

C-3 Downstream face of Dam.

C-4 Downstream face of Dam.

C-5 Downstream of Dam.

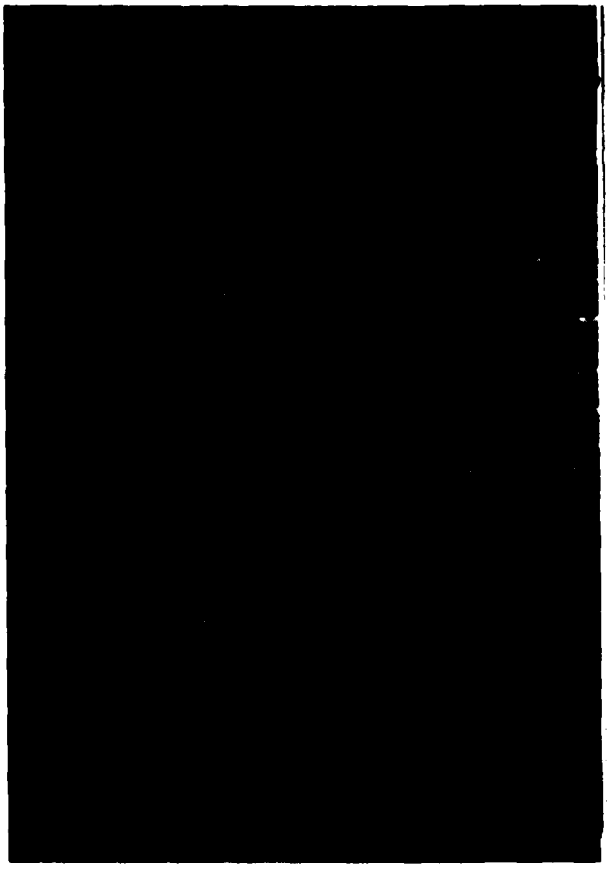
C-6 Mill Fire Protection System Intake Structure.

C-7 Dam Spillway.

C-8 Dam Spillway and Left Abutment.

C-9 Abandoned Outlet Control Structure.

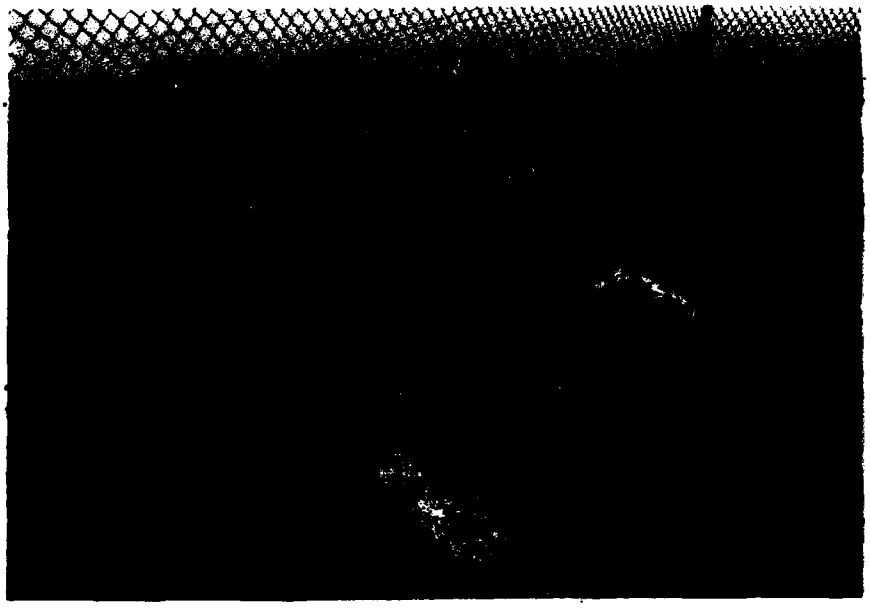
C-10 Outlet Channel and Leakage from Abandoned Outlet Control Structure.



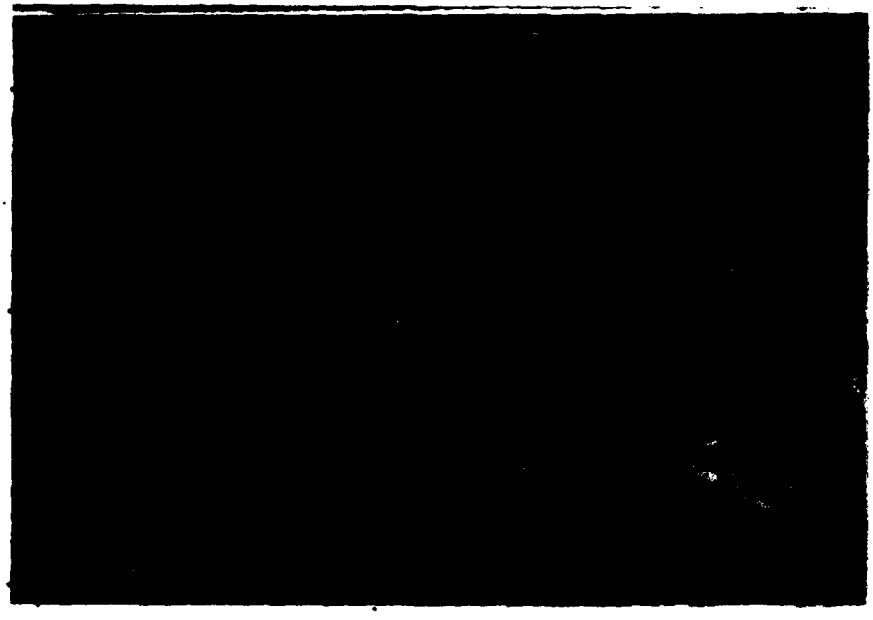
C-11 Abandoned Headrace.

C-12 Downstream Channel.

C-13 Structure for Abandoned Penstock Intake.



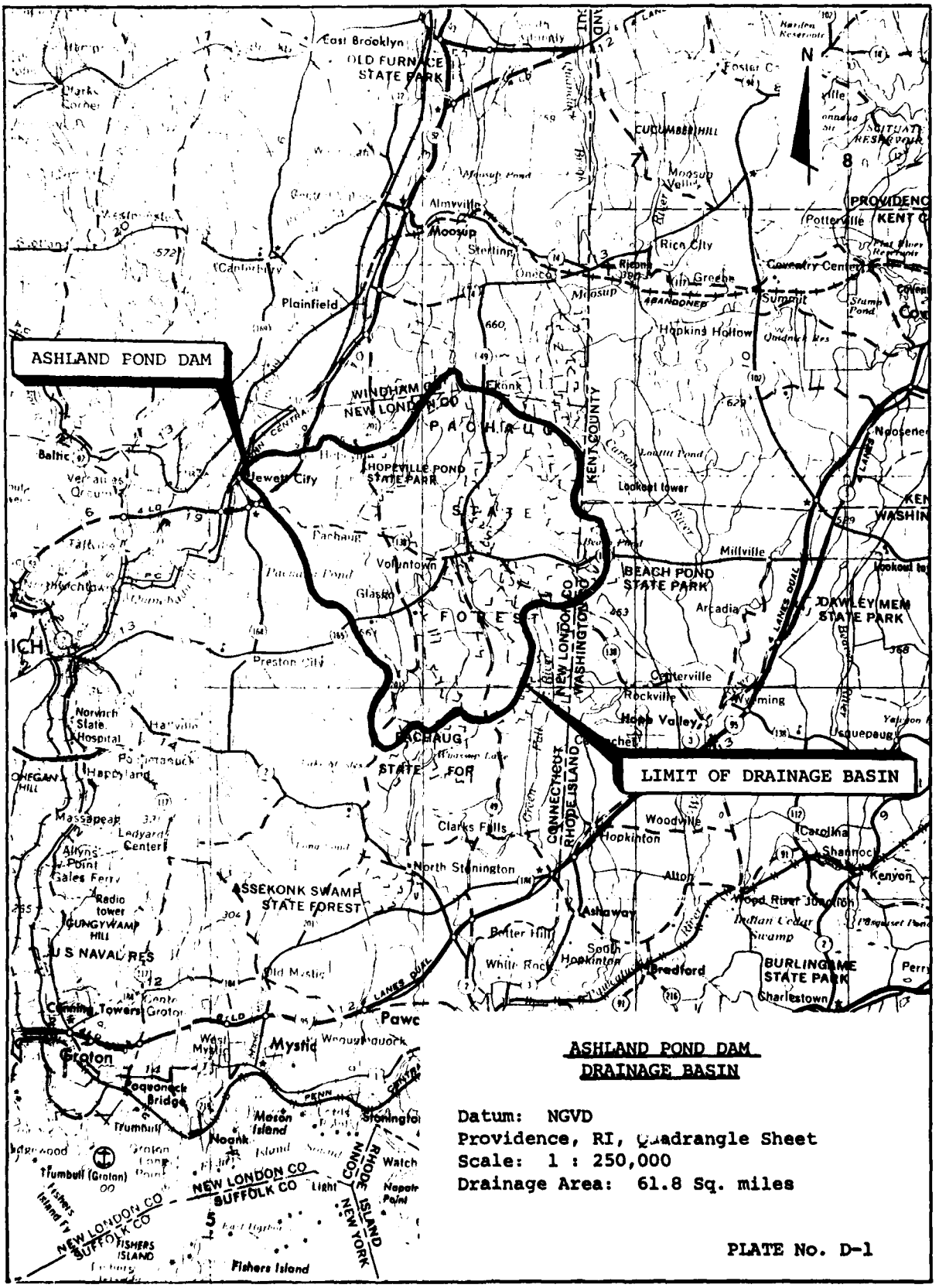
C-14 Structure for Abandoned Penstock Intake.



C-15 Erosion of Right Embankment.

APPENDIX D

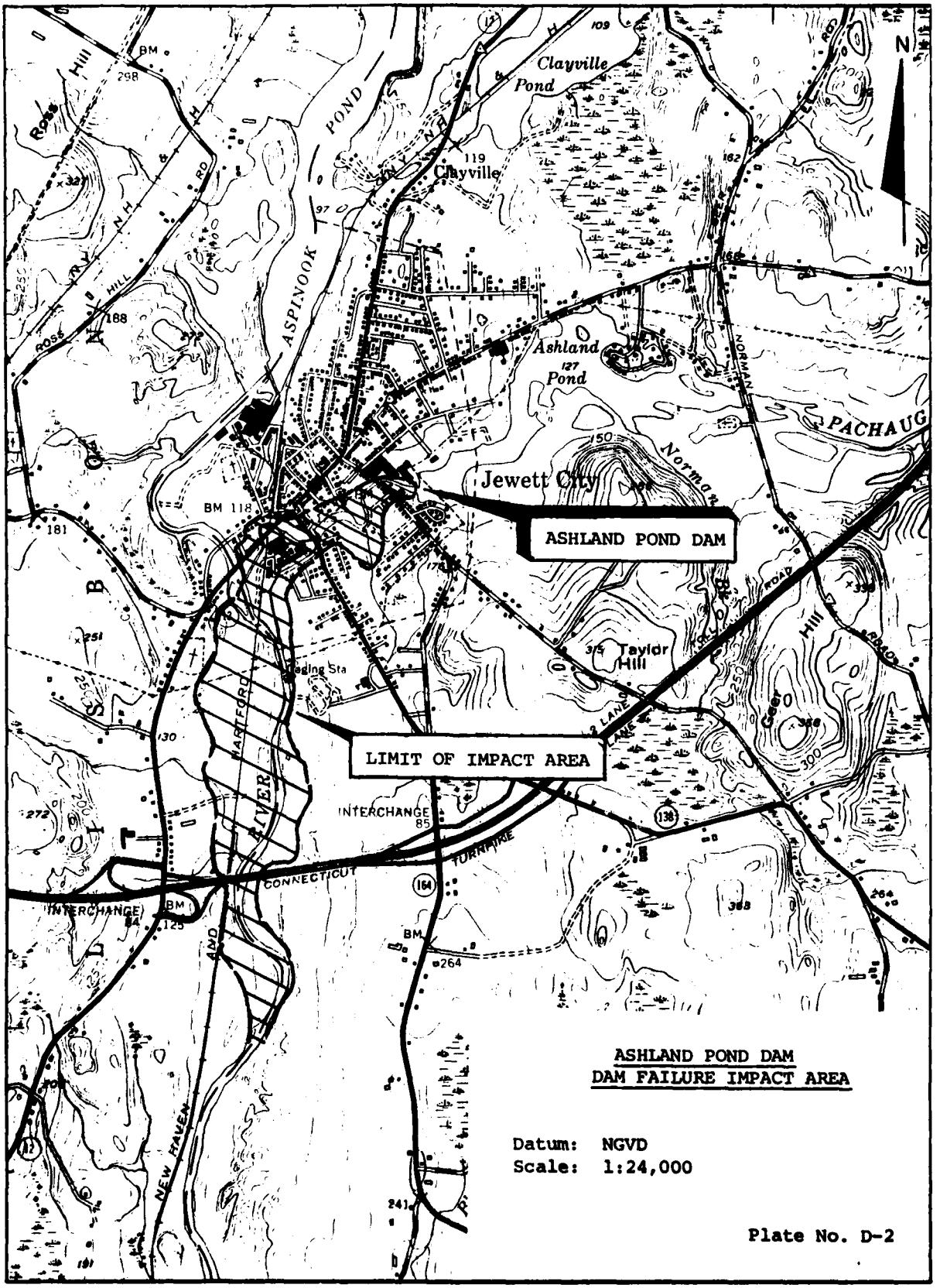
HYDROLOGIC AND HYDRAULIC COMPUTATIONS



ASHLAND POND DAM
DRAINAGE BASIN

Datum: NGVD
Providence, RI, Quadrangle Sheet
Scale: 1 : 250,000
Drainage Area: 61.8 Sq. miles

PLATE No. D-1



ASHLAND POND DAM
DAM FAILURE IMPACT AREA

Datum: NGVD
Scale: 1:24,000

Plate No. D-2

A. Size Classification — ASHLAND — Ashland Pond Dam

Height of dam = 25.0 ft.; hence Small

Storage capacity at top of dam (elev.133.0) = 1000 AC-FT.; hence Intermed.

Adopted size classification Intermediate

B.i) Hazard Potential

Dam is located in urban industrial area of Jewett City and is a source of standby water to its owner, United Merchants Manufacturer, Inc.. Failure of dam will cause appreciable damage to roads--Route 12 and Route 138-- and to many houses and mills.

ii) Impact of Failure of Dam at Maximum Pool (Top of Dam)

It is estimated from the rule of "thumb" failure hydrograph, that the following adverse impacts are a possibility by the failure of this dam.

a)	Loss of life	;	____ to ____	lives can be lost.
b)	Loss of homes	Yes ;	1 to 10	homes can be lost.
c)	Loss of buildings	YES ;	1 to 5	buildings can be lost.
d)	Loss of highways or roads	Yes ;	1 to 3	roads can be damaged.
e)	Loss of bridges	Yes ;	1 to 3	bridges can be lost.
f)	Miscellaneous	Yes ;	a) Power lines can be disrupted b) Mill building can be damaged.	

The failure profile can affect a distance of 10000 feet from the dam. For water surface elevation, see next page in Appendix D.

C. Adopted Classifications

HAZARD	SIZE	TEST FLOOD RANGE
High	Intermediate	PMF

Adopted Test Flood = Full PMF = 700 CSM

= 43274 CFS

D. Overtopping Potential

Drainage Area = 61.82 sq. miles

Spillway crest elevation = 127.0 NGVD

Top of Dam Elevation = 133.0 NGVD

Maximum spillway discharge Capacity without overtopping of dam = 5535 CFS

"test flood" inflow discharge = 43274 CFS

"test flood" outflow discharge = 42000 CFS

% of "test flood" overflow carried by spillway without overtopping = 13.2%

"test flood" outflow discharge portion which overflows over the dam = 36465

% of test flood which overflows over the dam = 86.8%

Estimating Maximum Probable Discharges - Inflow and Outflow Values Date of Inspection: 12/8/78 4/10/79

Name of Dam Ashland Pond Dam ; Location of Dam Pachang River ; Town Jewett City, Conn.

Watershed Characterization Flat to moderate; storages and swamps upstream ; 6.18 sq. miles of drainage area is swampy or occupied by storage reservoirs

Adopted "test" flood = One PMF = 700 CSM = 43274 CFS; Re = Effective Rainfall = 19.0 inches

D.A. = Drainage Area (Gross) = 61.82 Square Miles; Basin Slope = 0.03 hence; Flat to Moderate

S.A. = Surface Area of Reservoir = 0.13 Square Miles; Time of Concentration 6 - 10 hours.

Shape and Type of Spillway = Free overflow; vertical fall; sharp crest with a 6" lip.

B = Width of Spillway = 110.0 ± feet; C = Coefficient of Discharge = (3.33-Friction) = 3.30

Maximum Capacity of Spillway Without Overtopping = 5535 CFS = 13.2 % of test flood Outflow

Top of Dam Elevation = 133.0 ; Spillway Crest Elevation = 127.0

Overflow portion of Length of Dam = 400 ; C = Coefficient of discharge for Dam = 3.0

Name of Dam	Test Flood Q_p		Inflow Characteristics		Outflow Characteristics First Approximation			Outflow Characteristics Second Approximation			Outflow Characteristics Third Approximation (Adopted)		
	CSM	CFS	h_0 in feet	S_0 in in.	Q_{p1} CFS	h_1 in ft.	S_1 in in.	S_2 in in.	h_2 in ft.	Q_{p2} CFS	S_3 in in.	h_3 in ft.	Q_{p3} CFS
1	2	3	4	5	6	7	8	9	10	11	12	13	14
Ashland Pond Dam	PMF =700	43274	24.14	0.61	43274	10.0	0.38	0.35	9.71	42000	0.35	9.71	42000
	1/2 PMF =350	21637	15.22	0.38	21637	5.40	0.30	0.27	5.27	20000	0.27	5.25	20000

Q_p = Discharge; h= Surcharge height; S = Storage in inches

NOTE: Outflow discharge values are computed as per COE guidelines.

"Rule of Thumb Guidance for Estimating Downstream Dam Failure Discharge"

BASIC DATA

Name of dam Ashland Pond Dam Name of town Jewett City, Conn.

Drainage area = 61.82 sq. mi., Top of dam 133.0 NGVD

Spillway type = Overflow; vertical fall; sharp Crest of spillway 127.0 NGVD

Surface area at crest elevation = 0.13 Sq. Mi. (83.0 Acres)

Reservoir bottom near dam = 108.0 NGVD

Assumed side slopes of embankments 2H:1V

Depth of reservoir at dam site 25.0 = Y_o = 25.0 ft.

Mid-height elevation of dam = 120.5 NGVD

Length of dam at crest = 400 feet

Length of dam at mid-height = 375 feet

22% of dam length at mid-height = W_b = 84 feet

Step 1:

Elevation (NGVD)	Estimated Storage in AC-FT
127.0	502
128.0	585
129.0	668
130.0	751
131.0	834
132.0	917
133.0	1000

Step 2:

$$Q_{pl} = \frac{8}{27} W_b \sqrt{g} Y_o^{3/2} = 17565$$

Failure discharge = 17565 + 5535 = 23100 C.F.S.

NOTE: Failure of dam is assumed to be instantaneous when pool reaches top of dam.

Failure of dam is assumed as partial width - full depth failure.

Failure site is assumed at the side of spillway section.

Ashland Pond Dam

Dam Failure Analysis

1. Failure discharge with pool at top of dam (elev. 133.0) = 23100 CFS
2. Depth of water in reservoir at time of failure = 25.0 ft.
3. Maximum depth of flow downstream of dam at time of failure = 17.0 ft.
4. Water surface elevation just downstream of dam at time of failure = 125.0 NGVD

The failure discharge of 23100 CFS will enter Pachaug River and flow downstream 4,000 feet until the brook joins Quinebaug River. There is significant valley storage in this 4,000 feet length of brook to reduce the discharge substantially. Also due to roughness characteristics, obstructions and frictional losses, it is very likely that the unsteady dam failure flow will dissipate its wave and kinetic energy and thus convert to steady and uniform flow obeying Manning's formulae 4,000 feet downstream. The failure profile will have the following hydraulic characteristics:

DISTANCE FROM THE DAM	WATER SURFACE ELEVATION NGVD	REMARKS
0 + 00	133.0	Upstream of dam
0 + 00	125.0	Downstream of dam
10 + 00	120.0	
20 + 00	115.0	
30 + 00	110.0	
40 + 00	105.0	Joins Quinebaug River

Beyond 4,000 feet in Quinebaug River, the failure discharge will flow in the below given channel characteristics:

Q = 18500 CFS; S = 0.011+

n = 0.05; b = varies; d = 15.0 feet

Side slopes = 1V or 2H.

ASHLAND POND DAM

COMPUTATIONS FOR
SPILLWAY RATING CURVE

Spillway width = 110.0 feet ± Spillway crest elevation 127.0 NGVD

Length of dam = 400 feet; Top of dam elevation = 133.0 NGVD

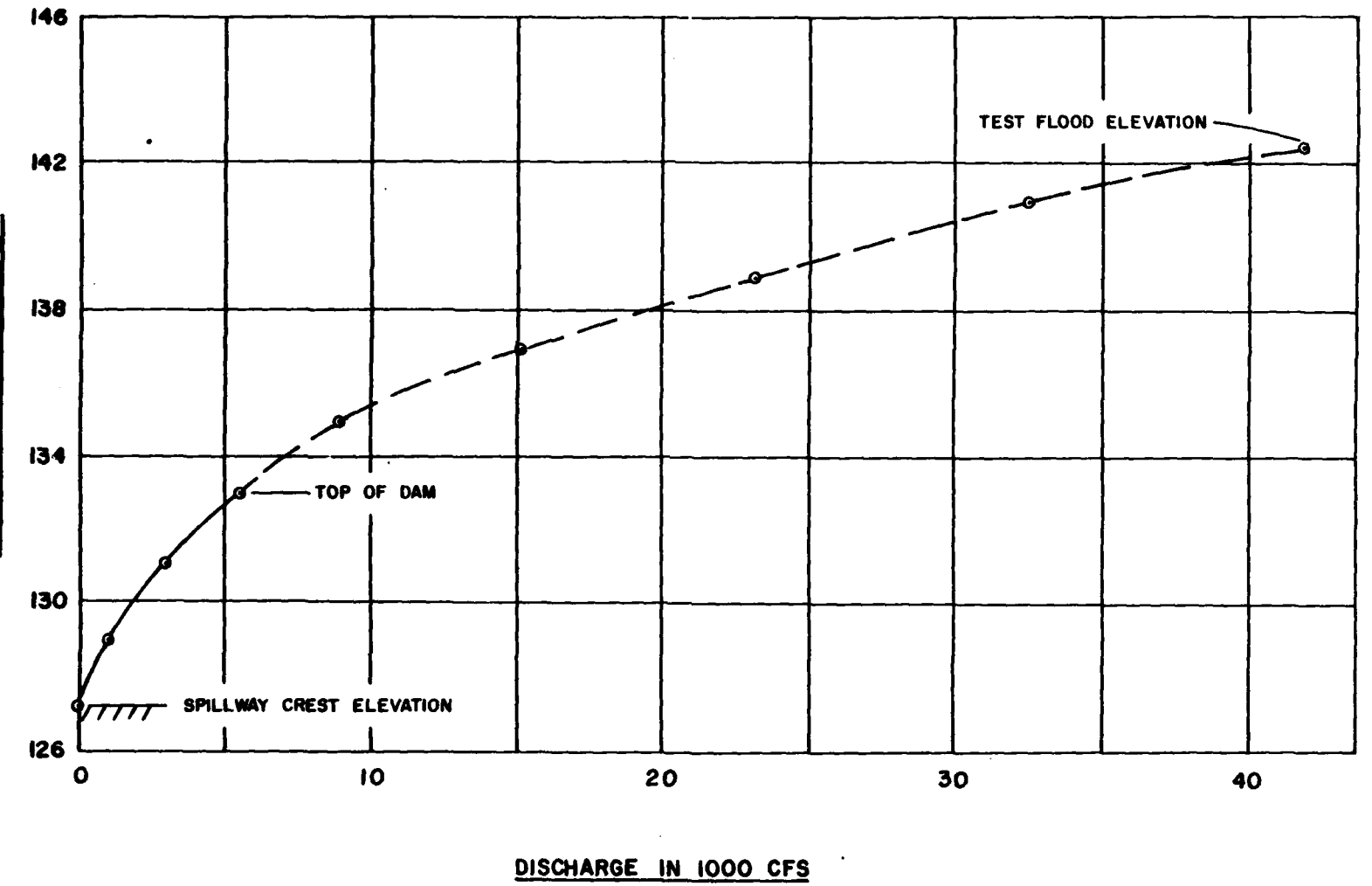
c = 3.3 for spillway and 3.0 for dam

SPILLWAY RATING CURVE COMPUTATIONS

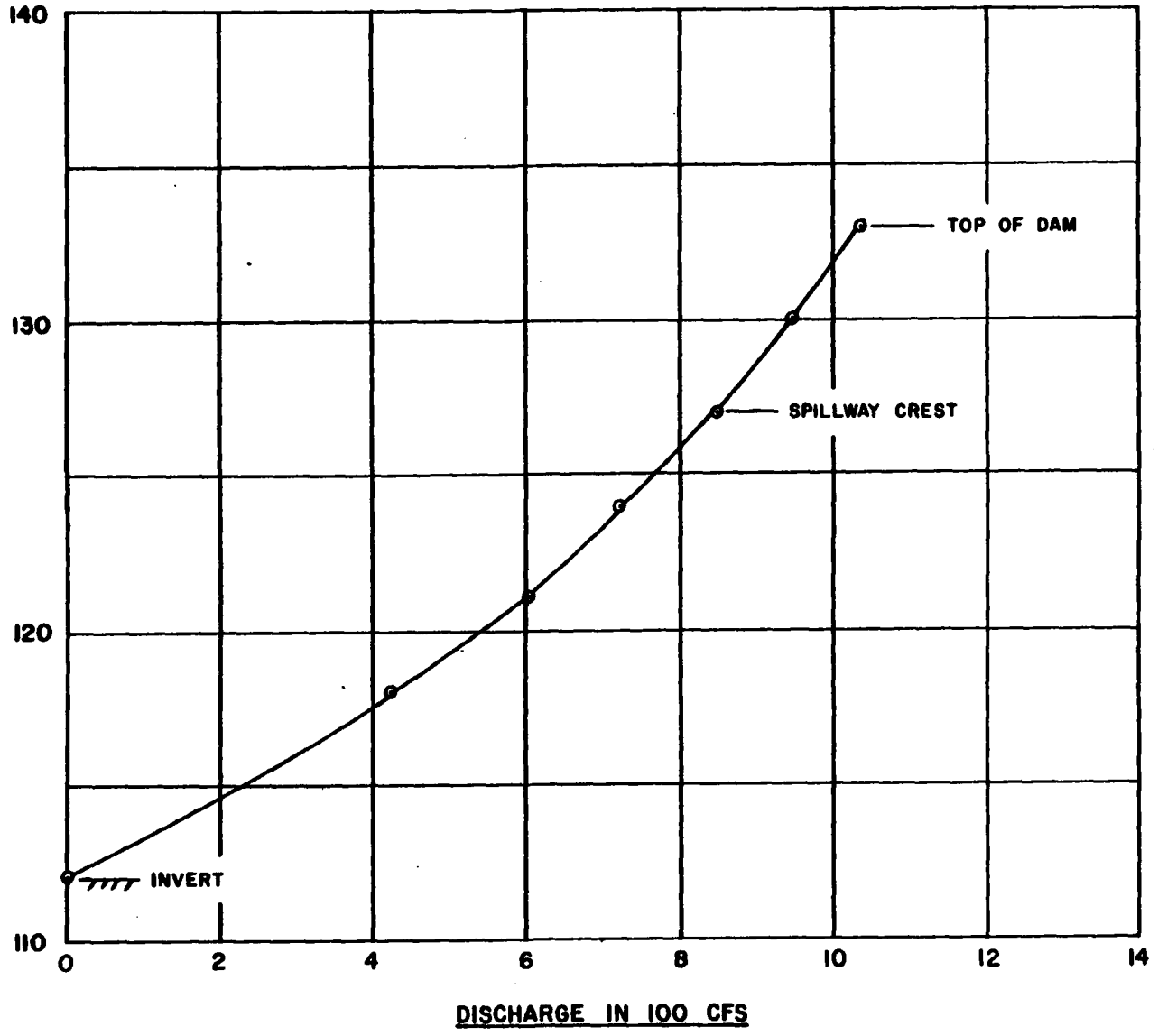
ELEVATION (FT.)	SPILLWAY DISCHARGE (CFS)	REMARKS
127.00	0	Spillway crest elevation
129.00	1027	
131.00	2904	
133.00	5535	Top of Dam
135.00	8929	
137.00	15135	
139.00	23171	
141.00	32688	
142.70	42000	Test Flood Elevation

Notes:

1. Maximum Spillway Capacity = 5535 CFS
2. Maximum Outlet Capacity = 1044 CFS At top of dam.
3. Total Maximum Discharge Capacity = 6579 CFS

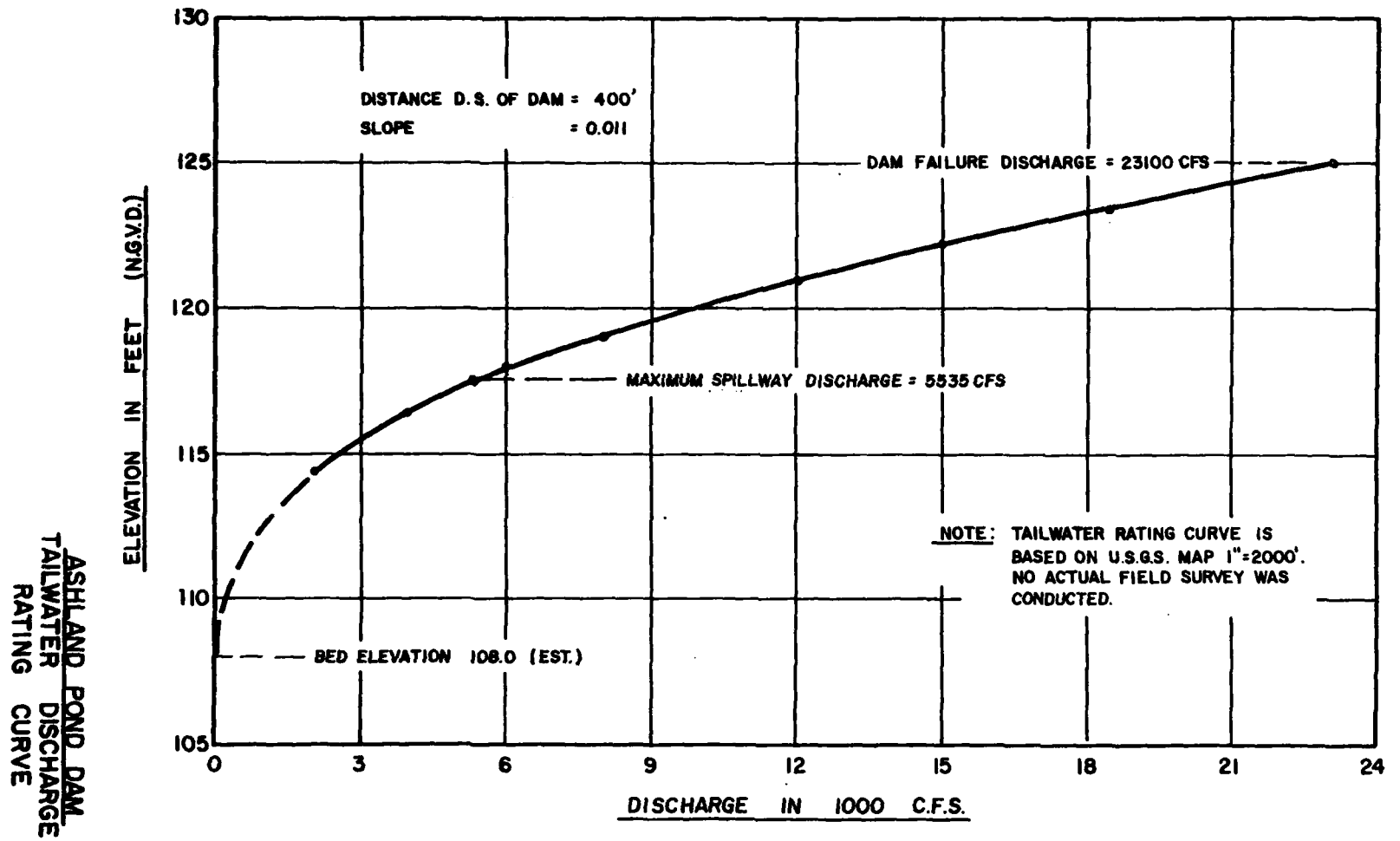


ASHLAND POND DAM
SPILLWAY RATING CURVE



ASHLAND POND DAM

OUTLET WORKS RATING CURVE


ASHLAND POND DAM
TAILWATER DISCHARGE
RATING CURVE
ELEVATION IN FEET (N.G.V.D.)
130
125
120
115
110
105
0
3
6
9
12
15
18
21
24
DISCHARGE IN 1000 C.F.S.
DISTANCE D.S. OF DAM = 400'
SLOPE = 0.011
DAM FAILURE DISCHARGE = 23100 CFS
MAXIMUM SPILLWAY DISCHARGE = 5535 CFS
BED ELEVATION 108.0 (EST.)
NOTE: TAILWATER RATING CURVE IS BASED ON U.S.G.S. MAP 1"=2000'. NO ACTUAL FIELD SURVEY WAS CONDUCTED.

APPENDIX E

INFORMATION AS CONTAINED IN THE NATIONAL INVENTORY OF DAMS

END

DATE
FILMED

9 84